FIG. 10

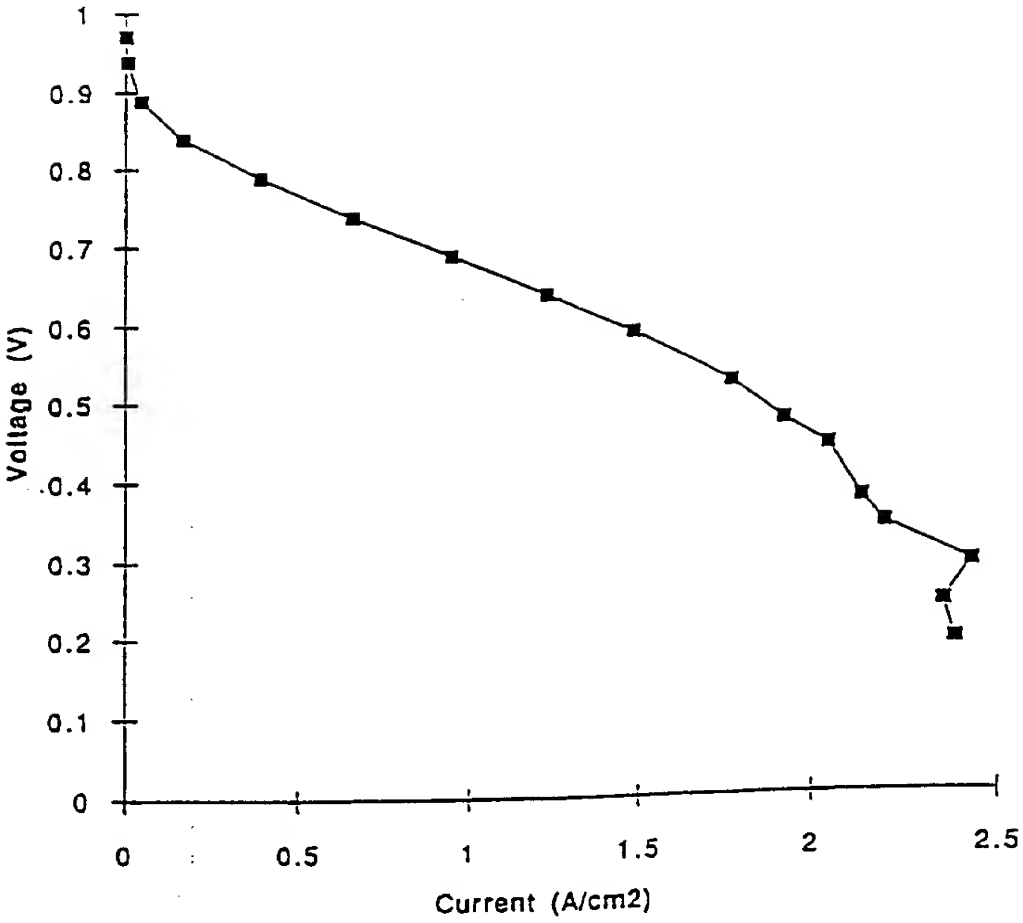


FIG. 11

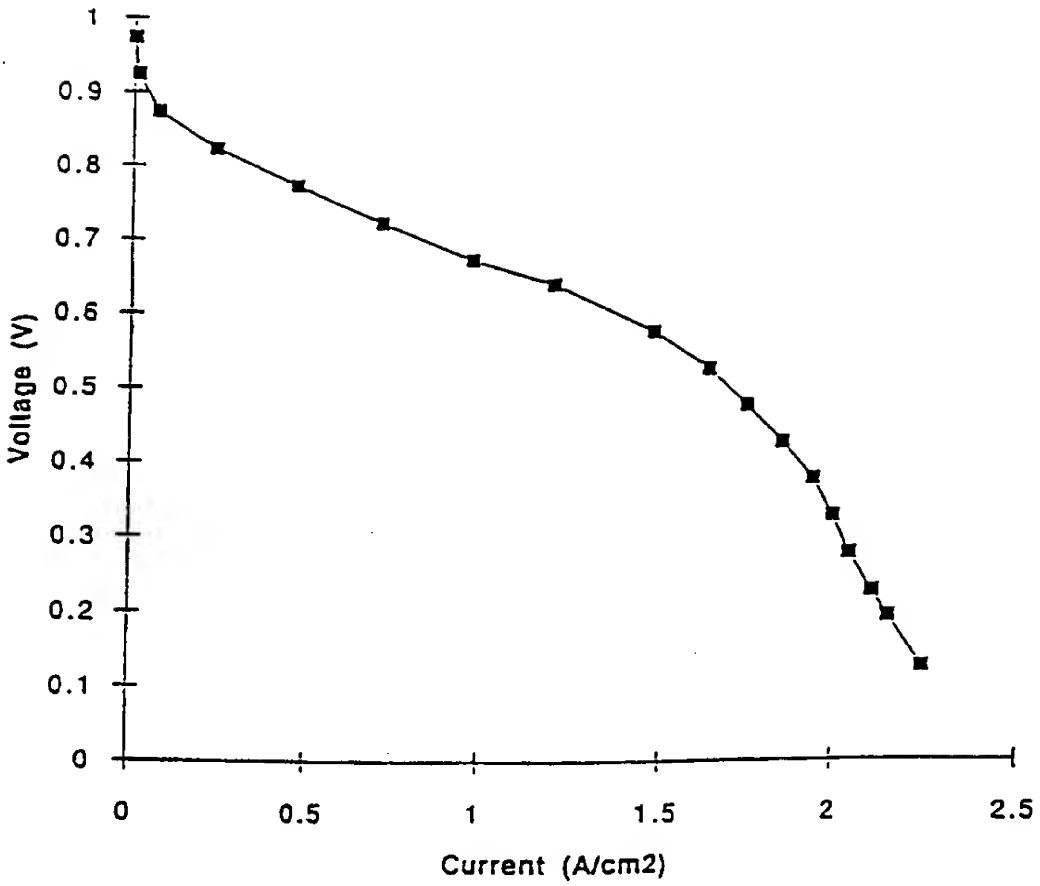


FIG. 12

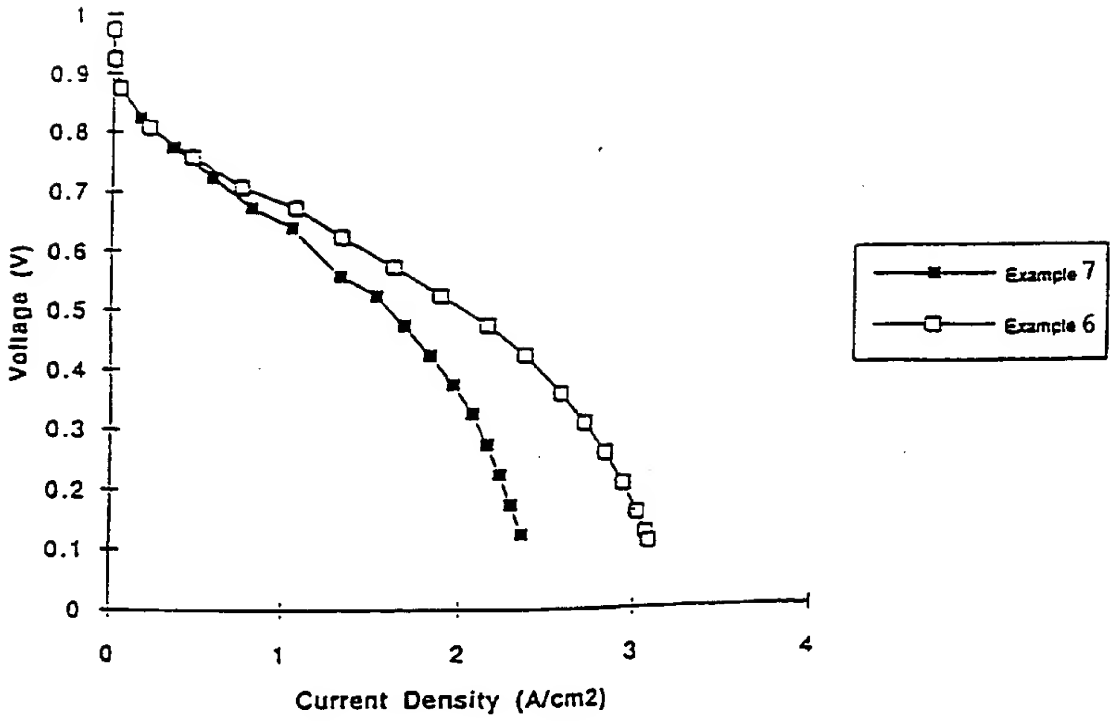


FIG. 13

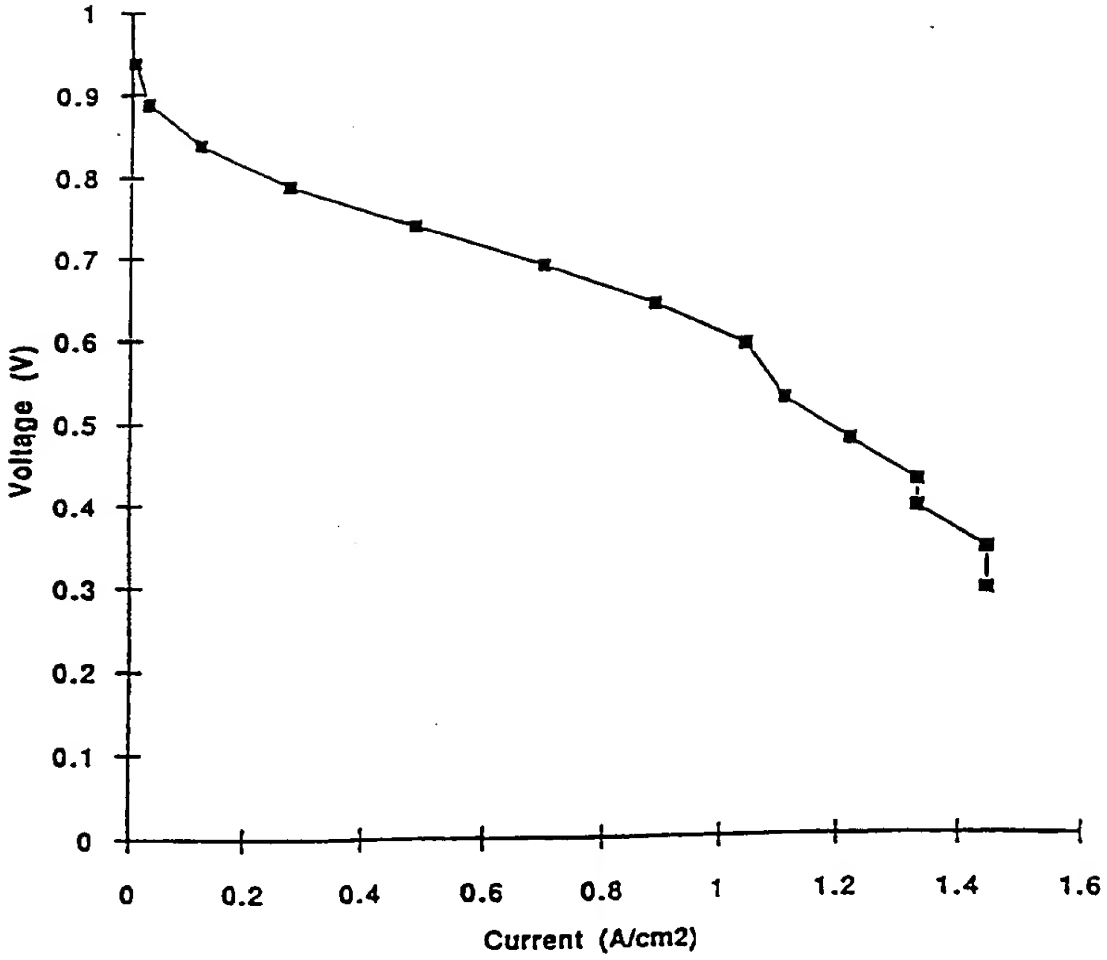
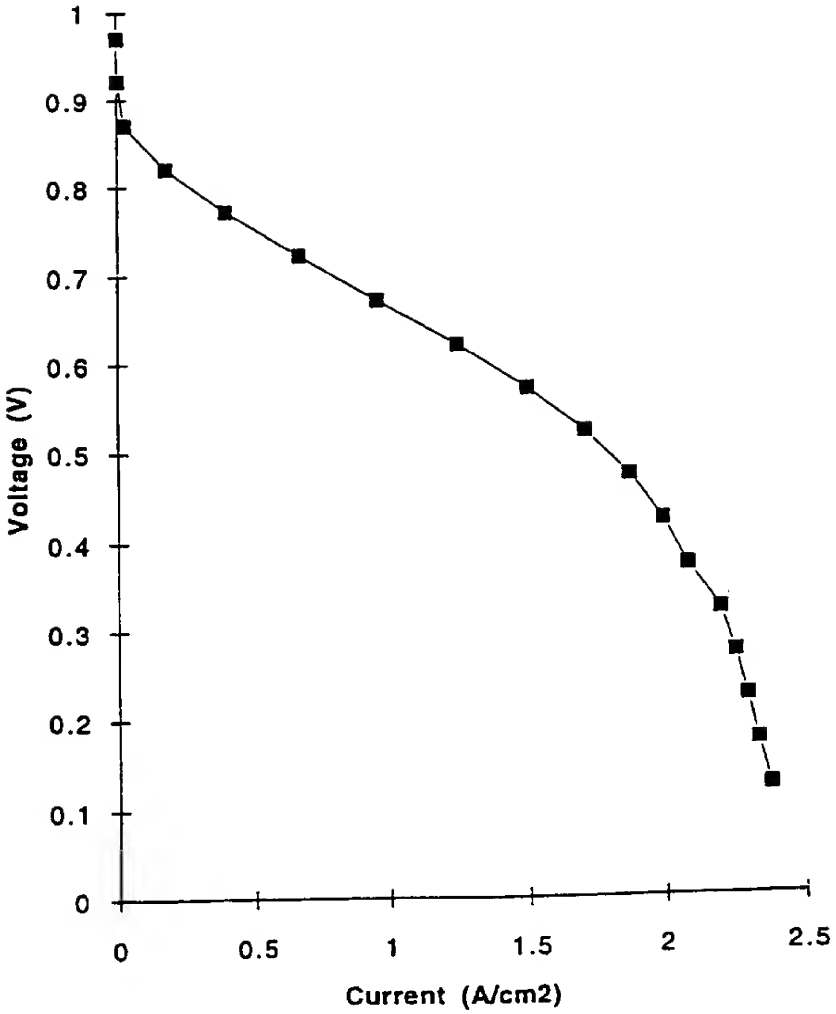


FIG. 14



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(71) Applicant: THE DOW CHEMICAL COMPANY [US/US]; 2030 Dow Center, Midland, MI 48674 (US).

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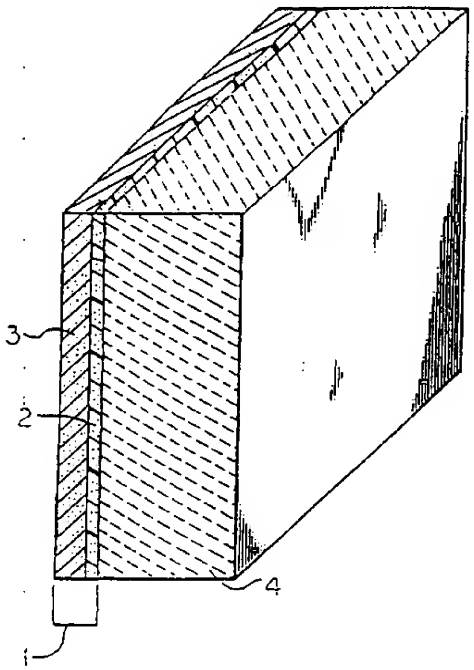
(74) Agent: GALBRAITH, Ann, K.; The Dow Chemical Company, Patent Dept., P.O. Box 1967, Midland, MI 48641-1967 (US).

(54) Title: FLOW FIELD STRUCTURES FOR MEMBRANE ELECTRODE ASSEMBLIES OF FUEL CELLS



(57) Abstract

An electrochemical fuel cell having a membrane electrode assembly (1) and a flow field (4) adjacent thereto wherein the flow field comprises an electrically conductive porous material having a porosity of at least 50 percent and a mean pore size of at least 35 microns. This fuel cell is able to operate at relatively high current densities and relatively high voltages at reduced gas flow rates.

* (Referred to in PCT Gazette No. 29/1997, Section II)

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INTERNATIONAL SEARCH REPORT

Intern ual Application No
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A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H01M8/02 H01M8/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H01M C25B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 629 015 A (PERMELEC SPA NORA) 14 December 1994 see page 10, line 23 - line 25; claims 1,3,5,10; figure 6 see page 7, line 25 - line 31 see page 6, line 14 - line 16 --- -/--	1,6,8, 12,13, 37-39,47

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
22 October 1997	05.11.97

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	D'hondt, J

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INTERNATIONAL SEARCH REPORT

Intern. ial Application No
PCT/US 96/15893

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

Intern ıal Application No
PCT/US 96/15893

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

Intern ial Application No
PCT/US 96/15893

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 577 291 A (JOHNSON MATTHEY PLC) 5 January 1994 see column 7, line 24 - line 46; claim 1 see column 10, line 16 - line 36	54,55, 58,59
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INTERNATIONAL SEARCH REPORT

In. .ational application No.
PCT/US 96/ 15893

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: 66-71,72-79
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
(Art. 6 PCT)
Obscurities, inconsistencies in the dependence of claims 66,72

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because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/210

Group I : claims 1-13 Fuel cell with electrode membrane assembly comprising a flow field structure with specific porosity. Purpose : Effective gas transport in the presence of water.

Group II : claims 14-24 Membrane electrode assembly with several catalytic layers comprising ionomer of varying equivalent weight. Purpose : Management of water content.

Group III : claims 25-35,36 Membrane electrode assembly with a catalytic layer comprising an ionomer with an equivalent weight falling in a certain range and said catalytic composition.

Group IV : Claims 37-48, 49-53 Fuel cell with membrane electrode assembly comprising conductive layers of varying porosity.

Group V : claims 54-59 Process of preparing a fuel cell having a membrane electrode assembly by applying a conductive composition intermediate the membrane and a conductive sheet.

Group VI : claims 60-63, 64-65, 66-71, 72-79 A composition comprising catalytic particles and organic compound with specific features and method in which said catalytic composition is used to prepare membrane electrode assemblies. Purpose : Affecting the pore characteristics of the resulting active layer due to the volatizable organic compound.

INTERNATIONAL SEARCH REPORT

Information on patent family members

Interna al Application No
PCT/US 96/15893

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